YUZHOU TONG

+65 87907684 | ytong004@e.ntu.edu.sg

EDUCATION BACKGROUND

The Chinese University of Hong Kong, Shenzhen Shenzhen, China

Bachelor of Engineering in Electronic Information Engineering, cGPA: 3.50/4.00*, mGPA:* 3.45/4.00 (rank:8/43)

- Relevant Courses: Wireless Communication Systems, Multi-Antenna Wireless Communication, Convex Optimizations for Communications Engineering
- Awards: Dean's List (15% in the School of Science and Engineering), Academic Scholarship Class B in 19-20 Academic Year (top 10% of the year), Academic Scholarship in 20-21 Academic Year (top 15% of the year), Outstanding Research Assistant

Nanyang Technological University Singapore

Master of Science in Communication Engineering

- Relevant Courses: Computer Networks, Digital Communication Systems, Advanced Digital Signal Processing

RESEARCH EXPERIENCE

Urban Anomaly Detection and Human Activity Classification with Cellular Base-station Traffic Aug 2022 - Present

- Used Universal Software Radio Peripheral (USRP) devices and softwares including Airscope and Wireshark to collect Downlink Control Information (DCI) messages within the LTE Physical Downlink Control CHannel (PDCCH)
- Processed the data to form an appropriate data set for machine learning training and testing use
- Designed machine learning algorithms for user activity classification and urban anomaly detection, and evaluated the proposed algorithm with the data set obtained previously

Rate Adaption for WiFi System Based on Multi-armed Bandit Problem Jan 2022 - Jun 2022

- Formulated the WiFi Rate Adaption problem with multi-armed bandit model
- Designed an algorithm to solve the problem by Thompson Sampling and Upper Confidence Bound Methods
- Implemented the rate adaption algorithm by modifying mac80211 source codes and test the performance in non-stationary channel environment with Raspberry Pi 4B and Dongtintech AIMB-B2205A

Adaptive Rate-Power Control under BATS Protocol Nov 2021 - May 2022

- Formulated the rate selection problem into a Markov Decision Problem (MDP)
- Solved the MDP using Q-learning and Dynamic Programming and analyzed the throughput upper bound of the system

The Rate Control Algorithm Improvement in Linux mac80211 Module July 2021 - October 2021

Research Assistant in Network Coding Lab at CUHK-Shenzhen

- Reproduced the statistic calculation for each rate in *Minstrel* algorithm in *mac80211* module
- Modified the *Minstrel* source files to force the wireless device always transmits data with the rate achieving maximum throughput while maintaining the rate sampling mechanism to better adapt the network coding system
- Associated two *ITA-5512*s with a *Raspberry Pi 4* which ran the Linux based *OpenWrt* operating system and utilized *iperf* as the testing tool to measure and compare the throughput, latency and network jitter of the original and modified algorithms to validate the modifications

Product Codes Design Based on Iterative Decoding Methods June 2021 - Present

Research Assistant in Network Coding Lab at CUHK-Shenzhen

- Designed and implemented the coding scheme using Reed-Muller Codes as row components and LDPC Codes as column components based on extensive reviews of existing product coding schemes, including LDPC product codes, LDPC convolutional codes and block turbo codes
- Designed and implemented two decoding algorithms including a list-decoding-based algorithm and an iterative decoding algorithm with MATLAB
- Validated that the iterative decoding algorithm provided a higher throughput over list-decoding-based algorithm and traditional coding schemes through the analysis of the rank distribution of decoding results and the throughput information
- Calculated and plotted the capacity curve of the fading channel model to give the theoretical bounds of the proposed coding schemes

Distributed Channel Estimation for Massive MIMO Systems May 2021 - July 2021

- Derived the variational Bayesian inference of the hidden variables in the hybird Dirichlet Process-Gaussian Model to understand the adaptive grouping sparse bayesian learning (AGSBL) algorithm
- Utilized QuaDriGa in MATLAB to implement AGSBL algorithm and traditional channel estimation algorithms including Minimum Mean Square Estimation and Least Square Estimation to simulate and compare the estimation accuracy
- Validated the AGSBL estimation enhanced the estimation accuracy over high signal-to-noise (SNR) region but also found that the algorithm performed suboptimally in low SNR region

COURSE PROJECTS

Microprocessor System Design Laboratory February 2021 - June 2021

- Utilized STM32 development board to implement an embedded system to practice the knowledge about Cortex-M3 based microprocessor platform with K-ARM development tool and FlyMcu for serial port downloads
- Developed a 2-player bouncing ball game on STM32 that utilized interrupts, timers, keys, beeper, communications port, color display, and other peripherals

Fundamental Machine Learning Project February 2021 - June 2021

- Implemented a 2-layer, feed-forward neural network and trained it using back-propagation algorithm and stochastic gradient descent to recognize handwritten digits, reported training/testing accuracy, training loss for different number of hidden nodes and hyper-parameters in Python
- Fitted a dataset using decision tree, bagging, random forests and AdaBoost, analyzed the variable importance in each method and tuned the hyper-parameters in the ensemble methods with *skleran* in Python
- Implemented four clustering algorithms including K-means, accelerated K-means with triangle-inequality, soft K-means, and GMM-EM, and three evaluations including purity, rand index and normalized mutual information to do clustering on UCI seed dataset, reported running iterations and time of each algorithm in Python

Low-Voltage CMOS Amplifier Design September 2020 - December 2020

- Utilized Eldo from Mentor Graphics to design a low-voltage low-power differential-input single-ended output amplifier with a given 0.18-μm n-well CMOS technology, verified the design using simulations and minimized the power consumption

Programming Paradigms Group Project February 2020 - June 2020

- Utilized C++ to implement an operating system simulator in a four-member group to practice object-oriented programming,
- Designed and implemented a task scheduler supporting four scheduling algorithms and designed a GUI with Qt widgets

EXTRA-CURRICULUM ACTIVITIES

Assist the Daily Work in the University Admission Office May 2020 - December 2020

Student Assistant, Admission Office, CUHK-Shenzhen

- Provided brief presentation about the university history and tradition, and served as a student counselor to offer admission-related information to prospective students
- Assisted to conduct the admission tests and interviews for all applicants, and handled emergent cases such as interview venue change and applicant incomplete information collection

SKILLS

- **Language:** Chinese Mandarin (native), English (TOEFL: 101, GRE: 318)
- **Technical Skills:** Python, C++, MATLAB, LaTex